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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,941	03/23/2001	Stephen Christopher Kitson	30001065	6953

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Hewlett-Packard Company
Intellectual Property Administration
P. O. Box 272400
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EXAMINER

DUONG, THOI V

ART UNIT	PAPER NUMBER
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2871

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/816,941

Applicant(s)

KITSON ET AL.

Examiner

Thoi V. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9, 11-20 and 22-49 ~~is/are~~ are pending in the application.
- 4a) Of the above claim(s) 12-20, 22, 23 and 30-33 ~~is/are~~ are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 11, 24-29 and 34-49 ~~is/are~~ are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/02/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Amendment filed January 16, 2007.

Claims 8, 10 and 21 were cancelled. Claims 1-7, 9, 11-20 and 22-49 are currently pending in this application; of these claims, claims 12-20, 22, 23 and 30-33 are withdrawn and claims 1-7, 9, 11, 24-29 and 34-49 are considered in this office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 34-38 and 43-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Funada et al. (Funada, US 4,232,947).

Re claim 34, as shown in Fig. 6, Funada discloses a liquid crystal device comprising:

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a first cell wall 14 and a second cell wall 15 enclosing a layer of liquid crystal material;

electrodes for applying an electric field across at least some of said liquid crystal material (col. 3, lines 47-56); and

a surface alignment structure on the inner surface of at least the first cell wall 14 providing a single desired uniform alignment to a liquid crystal director, said alignment selected from the group consisting of planar, tilted and homeotropic (col. 3, lines 32-40);

wherein, as shown in Figs. 4 and 5, said surface alignment structure comprises a multiplicity of micro-grooves or strips (a two dimensional array of Applicant's alignment posts), which are shaped and oriented to produce the desired, and which have a height h of 1 micrometer (10, 000 angstrom) (col. 2, lines 61-68 and col. 3, lines 1-40), which meets the claimed range of about 0.5 to 5 micrometer.

Re claim 35, Funada suggest that the posts have a height (depth of microgrooves) of 1 micrometer (10, 000 angstrom) (col. 2, lines 61-68), which meets the claimed range of about 1.0 to 1.2 micrometer.

Re claim 36, as shown in Fig. 5(d) of Funada, at least part of a side wall of said posts is tilted with respect to the normal to the plane of the first cell wall.

Re claim 38, Funada suggests that these alignment posts are spaced about "Alpha = 10,000 Angstroms" (or 1 micrometer) (col. 3, lines 1-16), the spacing lying within the claimed range from about 0.1 to 5 micrometer.

Accordingly, re claim 37, each post also has a width of about 1 micrometer since each post has substantially symmetrical shape (col. 3, lines 1-7).

Re claims 43-45, as shown in Figs. 5(a), 5(b) and 5(d), of Funada, the alignment posts have a triangular cross section, or a round cross section, or an oval cross section. Accordingly, the alignment posts having a square section can be utilized according to an intended application.

Re claim 46, Funada discloses that the liquid crystal material is a nematic liquid crystal (col. 2, lines 7-11).

4. Claims 1, 2, 4, 9, 11, 24-29, 34, 36, 39 and 41-49 are rejected under 35 U.S.C. 102(e) as being anticipated by Samant et al. (Samant, US 6,519,018 B1).

Re claim 1, as shown in Figs. 2 and 3, Samant discloses a liquid crystal device comprising:

a first cell wall and a second cell wall enclosing a layer of liquid crystal material (col. 2, lines 5-9);

electrodes for applying an electric field across at least some of said liquid crystal material (col. 1, lines 30-36 and col. 2, lines 1-9); and

a surface alignment structure on the inner surface of at least the first cell wall 32 providing a single desired uniform alignment to a liquid crystal director, said alignment selected from the group consisting of planar, tilted and homeotropic (col. 2, lines 43-58);

wherein said surface alignment structure comprises a two dimensional array of alignment posts 34 (pillars) which are formed from a material selected from the group consisting of a photoresist material and a plastics material, and which are shaped and

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oriented to produce the desired alignment (col. 4, lines 35-63; col. 5, lines 30-35 and col. 6, lines 60-64).

Re claim 2, said posts have a height in the range from about 2 to 10 micrometers, which overlaps the claimed range of about 0.5 to 5 micrometers (col. 5, lines 15-20).

Re claim 11, as shown in Figs. 2 and 3, Samant discloses a cell wall for use in manufacturing a liquid crystal device, comprising a wall structure 32 having a surface alignment structure on a surface thereof, for providing a single desired uniform alignment to a liquid crystal director,

wherein said alignment is selected from the group consisting of planar, tilted and homeotropic (col. 2, lines 43-58),

wherein said surface alignment structure comprises a two dimensional array of alignment posts 34 which are formed from a material selected from the group consisting of a photoresist material and a plastics material, and which are shaped and oriented to produce the desired alignment (col. 4, lines 35-63 and col. 5, lines 30-34).

Re claim 34, as shown in Figs. 2 and 3, Samant discloses a liquid crystal device comprising:

a first cell wall and a second cell wall enclosing a layer of liquid crystal material (col. 2, lines 5-9);

electrodes for applying an electric field across at least some of said liquid crystal material (col. 1, lines 30-36 and col. 2, lines 1-9); and

a surface alignment structure on the inner surface of at least the first cell wall 32 providing a single desired uniform alignment to a liquid crystal director, said alignment selected from the group consisting of planar, tilted and homeotronic (col. 2, lines 43-58);

wherein said surface alignment structure comprises a two dimensional array of alignment posts 34 (pillars) which are shaped and oriented to produce the desired alignment (col. 4, lines 35-63 and col. 5, lines 30-35), and which have a height in the range from about 2 to 10 micrometers (col. 5, lines 15-20), this range overlapping the claimed range of about 0.5 to 5 micrometers.

Re claim 48, as shown in Figs. 2 and 3, Samant discloses a liquid crystal device comprising:

a first cell wall and a second cell wall enclosing a layer of liquid crystal material (col. 2, lines 5-9);

electrodes for applying an electric field across at least some of said liquid crystal material (col. 1, lines 30-36 and col. 2, lines 1-9); and

a surface alignment structure on the inner surface of at least the first cell wall 32 providing a single desired uniform alignment to a liquid crystal director, said alignment selected from the group consisting of planar, tilted and homeotronic (col. 2, lines 43-58);

wherein said surface alignment structure comprises a two dimensional array of alignment posts 34 (pillars) which are formed from a material selected from the group consisting of a photoresist material and a plastics material, which are shaped and

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oriented to produce the desired alignment (col. 4, lines 35-63 and col. 5, lines 30-35), and which have a height in the range from about 2 to 10 micrometers (col. 5, lines 15-20), this range overlapping the claimed range of about 0.5 to 5 micrometers.

Re claims 4 and 36, at least part of a side wall of said posts 34 is tilted with respect to the normal to the plane of the first cell wall as shown in Fig. 2 (col. 4, lines 40-49).

Re claims 9 and 41, said posts are of a different shape in different regions of the device (col. 4, lines 57-63).

Re claims 24-27 and 42-45, Samant discloses that the alignment posts may have different shapes including square, rectangular, triangular, circular, ellipsoid, and the like (col. 4, lines 57-63). Accordingly, the alignment posts may have a square cross section, a round cross section, a triangular cross section, or an oval cross section.

Re claims 28 and 46, Samant discloses that the liquid crystal material is a nematic liquid crystal (col. 1, lines 30-36).

Re claims 29 and 47, the liquid crystal display device of Samant further comprises on or more spacer posts, said one or more spacer posts spanning the entire cell (col. 5, lines 15-20).

Re claim 39, Samant discloses that the posts are formed from a plastics material (col. 5, lines 30-35).

Re claim 49, Samant discloses that said posts are not treated with or formed from a material which induce local homeotropic alignment in the liquid crystal material (col. 2, lines 43-58).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 9, 11, 25-28, 39, 41 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funada et al. (Funada, USPN 4,232,947) in view of Nomura et al. (Nomura, US 4,996,123).

Re claim 1, as shown in Fig. 6, Funada discloses a liquid crystal device comprising:

a first cell wall 14 and a second cell wall 15 enclosing a layer of liquid crystal material;

electrodes for applying an electric field across at least some of said liquid crystal material (col. 3, lines 47-56); and

a surface alignment structure on the inner surface of at least the first cell wall 14 providing a single desired uniform alignment to a liquid crystal director, said alignment selected from the group consisting of planar, tilted and homeotropic (col. 3, lines 32-40);

wherein, as shown in Figs. 4 and 5, said surface alignment structure comprises a multiplicity of micro-grooves or strips (a two dimensional array of Applicant's alignment posts), which are shaped and oriented to produce the desired alignment (col. 2, lines 61-68 and col. 3, lines 1-40).

However, Funada does not disclose that the alignment posts are formed from a material selected from the group consisting of a photoresist material and a plastics material.

As shown in Figs. 8 and 9, Nomura suggests that an optically oriented layer 1 (1b) formed of a photoresist material on a substrate 3 (col. 2, lines 35-42 and col. 5, lines 17-26).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal device of Funada with the teaching of Nomura by forming the alignment posts from a material selected from the group consisting of a photoresist material in order to attain a steep and extremely fine pattern profile on the cell wall (col. 6, lines 58-63).

Re claims 2 and 3, Funada suggest that the posts have a height (depth of microgrooves) of 1 micrometer (10,000 angstrom) (col. 2, lines 61-68), which meets the claimed range of about 0.5 to 5 micrometer or about 1.0 to 1.2 micrometer. Nomura also suggests the posts having a height (thickness of the photoresist pattern) of 1 micrometer (col. 5, lines 23-26).

Re claim 6, Funada suggests that these alignment posts are spaced about "Alpha =10,000 Angstroms" (or 1 micrometer) (col. 3, lines 1-16), the spacing lying within the claimed range from about 0.1 to 5 micrometer.

Accordingly, re claim 5, each post also has a width of about 1 micrometer since each post has substantially symmetrical shape (col. 3, lines 1-7). Nomura also suggests

the posts having a width of less than 0.5 micrometer, which meets the claimed range of about 0.2 to 3 micrometer.

Re claim 4, as shown in Fig. 5(d) of Funada, at least part of a side wall of said posts is tilted with respect to the normal to the plane of the first cell wall.

Re claims 9 and 41, said posts 1b are of a different shape in different regions of the device as shown in Fig. 9D of Nomura.

Re claims 25-27, as shown in Figs. 5(a), 5(b) and 5(d) of Funada, the alignment posts have a triangular cross section, or a round cross section, or an oval cross section.

Re claim 28, Funada discloses that the liquid crystal material is a nematic liquid crystal (col. 2, lines 7-11).

Re claim 39, Nomura discloses that the posts are formed from a photoresist material as shown in Figs. 8 and 9 (col. 2, lines 35-42 and col. 5, lines 17-26).

Re claim 49, Funada discloses that said posts are not treated with or formed from a material which induce local homeotropic alignment in the liquid crystal material (col. 3, lines 32-38).

Re claim 11, claim 11 recites the limitations of claim 1 which is rejected above.

Re claim 48, claim 48 recites the limitations of claims 1 and 2 which are rejected above.

7. Claims 7 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Samant et al. (Samant, US 6,519,018 B1) in view of JP 5-249463 (JP'463).

Samant discloses a liquid crystal device that is basically the same as that recited in claims 7 and 40 except for the liquid crystal material containing a surfactant.

JP'463 discloses that a surfactant is added into the liquid crystal to facilitate high-grade display without generating crosstalks (Abstract).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal device of Samant with the teaching of JP'463 by adding a surfactant into the liquid crystal material so as to facilitate high-grade display without generating crosstalks (Abstract).

8. Claims 42 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funada et al. (Funada, US 4,232,947) in view of Samant et al. (Samant, US 6,519,018 B1).

Funada discloses a liquid crystal device that is basically the same as that recited in claim 47 except for one or more spacer posts spanning the entire cell.

As shown in Figs. 2 and 3, Samant discloses a liquid crystal device comprising spacer posts 38 spanning the entire cell to act as spacers between the planar components of the device (col. 5, lines 15-20).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal device of Funada with the teaching of Samant by forming spacer posts spanning the entire cell for maintaining the cell gap between the planar components of the device (col. 5, lines 15-20).

Re claim 42, Samant discloses that the alignment posts may have different shapes including square, rectangular, triangular, circular, ellipsoid, and the like (col. 4, lines 57-63). Accordingly, it is obvious that the alignment posts may have a square cross section, a round cross section, a triangular cross section, or an oval cross section.

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9. Claims 24 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funada et al. (Funada, US 4,232,947 in view of Nomura et al. (Nomura, US 4,996,123) as applied to claims 1-6, 9, 11, 25-28, 39, 41 and 48 above and further in view of Samant et al. (Samant, US 6,519,018 B1).

Funada as modified in view of Nomura discloses a liquid crystal device that is basically the same as that recited in claim 29 except for one or more spacer posts spanning the entire cell.

As shown in Figs. 2 and 3, Samant discloses a liquid crystal device comprising spacer posts 38 spanning the entire cell to act as spacers between the planar components of the device (col. 5, lines 15-20).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal device of Funada with the teaching of Samant by forming spacer posts spanning the entire cell for maintaining the cell gap between the planar components of the device (col. 5, lines 15-20).

Re claim 24, Samant discloses that the alignment posts may have different shapes including square, rectangular, triangular, circular, ellipsoid, and the like (col. 4, lines 57-63). Accordingly, it is obvious that the alignment posts may have a square cross section, a round cross section, a triangular cross section, or an oval cross section.

Response to Arguments

10. Applicant's arguments filed January 16, 2007 have been fully considered but they are not persuasive.

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Applicant argued that Samant does not describe walls 34 as being shaped or oriented to produce a desired alignment since bond anisotropy produces the desired alignment.

The Examiner disagrees with Applicant's remarks since the walls are designed to be a surface alignment structure which are shaped and oriented to produce the desired alignment (i.e., align liquid crystal molecules vertical to the floor of the cell in which the wall is found) as shown in Figs. 2 and 3. Even though the bond anisotropy is formed on the surface of the wall, the bond anisotropy is a part of the wall and make the wall to become a surface alignment structure which is similar to that of the claimed invention. Moreover, the claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim (see MPEP 2114). Accordingly, Samant does anticipate the claimed invention.

Applicant's arguments with respect to claims 3, 5, 6, 35, 37 and 38 are also moot in view of the new grounds of rejection shown above.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi V. Duong

A handwritten signature in black ink, appearing to read 'Thoi V. Duong', written in a cursive style.

03/18/2007